

arated at those places corresponding to the infoldings when dry, as shown at *b*, fig. 5. In other words, the imbibition of water causes the contents to increase, and the somewhat collapsed outer wall is distended by the thin hyaline inner and continuous coat. This causes the separation of the three portions of the denser outer coat and brings into prominence the belts of the exposed inner walls. These belts are like broad meridians upon the sphere that reach from near one so-called pole to the other. Midway, or at what may be termed the equator, there is an evident circular spot called the pore, and from one of the three the pollen tube protrudes in germination. At this equator there are also two evident radiating belts for each pore, one on each side, and in the equatorial line, so that a direct view upon a pore often gives the appearance of a cross.

As the size varies in the order, and is quite constant for the species, the micrometer may become a material aid in classification.

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A new grass.

GEORGE VASEY.

(WITH PLATE XII.)

Among the plants recently collected by Dr. Ed. Palmer, at La Paz, in Lower California, is a grass which presents many peculiar and interesting points, and whose relationship is very obscure.

It is a dioecious grass, 8 to 12 inches high, of a rigid habit, with erect culms from a creeping rhizome; the rigid, pungently-pointed, conduplicate leaves crowded toward the base, with loose overlapping sheaths. The culms are branching below, and sometimes continue to emit short fascicled branches nearly to the panicle; indeed, the panicle itself, in the female plant, seems to be a succession of similar branches reduced and modified.

The male plants have a racemose-spicate inflorescence, consisting of a single terminal sessile panicle of 3 to 5 alternate approximate spikelets, which are $\frac{3}{4}$ of an inch long, or there may be an umbellate cluster of 2 or 3 such racemes, or several single lateral branches of the same, on pedicels an

inch or two long. These male spikelets usually have 10 to 15 flowers of the ordinary structure (fl. gl., palet and stamens) but with only one empty glume or none. In appearance they somewhat resemble those of *Distichlis*, or *Uniola*.

The fertile panicle is composed of a variable number (3 to 6) of lateral branches, which are approximate, and each one partly enclosed by the loose sheath of a leaf. These lateral branches, or flower-clusters, consist of a number of bracts, and one or more (3 or 4) fruiting spikes (sometimes a fruiting spike has only a small simple bract at its base) or there may be 2 or 3 alternate palet-like bracts, one of which contains in its axil a fruit spike, the other (at least sometimes) contains a small abortive branch, but they have two strong winged nerves, one to each side of the middle, as in an ordinary palet, but some of these have in addition smaller nerves between the large one and the margin. The fruit spike is linear, tapering to a sharp point an inch long or less, cylindrical, largest near the base, dense, and containing, imbedded in its substance, two linear seeds, one above the other, each 2 lines long, with no other covering, the two styles emerging through a small furrowed opening, and partly covered with a slender tongue proceeding from the body of the spike. The female fascicles seem to represent a much condensed branch, from which originate several fruiting spikes. These spikes do not, according to my observation, terminate a branch, but rather arise from the base and sides of a branch or rhachis, which terminates with an abortive branch.

Perhaps, in most if not all cases, from each joint of the rhachis arises one of these bracts, and encloses a fruiting spike and, between that and the bract, an abortive branch, or what I take to be such, consisting of a smaller palet-like bract flattened and the two sides overlapping and enclosing some more rudimentary bracts.

Sometimes the leaf-sheath of the fascicle answers for a bract and embraces a fruit spike, and also one of the small abortive branches or rudiments. What is the nature of this fruit spike? It is a spike with, most generally, two spikelets, each reduced to a single ovary with its two styles, the styles protruding from a lateral opening, and the ovary perfectly imbedded in the condensed tissue, which probably represents a flowering glume. Are there any analogous examples among grasses? There are several monœcious grass which have the female flowers almost completely enclosed in a bony envelope, of which a familiar example is *Coix lachryma*,

commonly called Job's tears. Here the female is at the base of the spike, enclosed in the globular envelope, which not only contains the female flower, but through which also passes the rhachis, which emerges at the apical opening with the styles, and is continued above giving rise to the male flowers. The bony covering is probably an indurated bract. But in this case all the usual envelopes of the flower are present. Another example is the *Euchlæna luxurians* or Teosinte, in which the female flowers are almost completely enclosed in indurated excavations of the rhachis; but here also the accessory organs of the flower are present. The case of *Tripsacum dactyloides* is very similar. If we could consider *Coix* as dioecious, or with separate spikes for the two sexes, we might have some analogy, but probably more analogy, if we could separate the sexes in *Tripsacum* and *Euchlæna*.

I sent specimens of this grass to Prof. Hackel, of Austria, and in a letter to me he states that it belongs to the genus *Jouvea* Fourn. This genus is described by Fournier from a female plant or plants collected on the sea coast of Mexico, by whom I know not. I have not been able to get access to the original published description which was made in the Bulletin of the Belgian Botanic Society, vol. 15.

Mr. Bentham in the *Genera Plantarum* admits this genus *Jouvea* with a query, and states that he had not seen the plant. It was considered by Bentham to be related to *Buchloe* and *Opizia*.

In *Buchloe* the outer glumes of the female spikelets are much indurated and closely enfold the flower, which however has the usual accessory parts. I can see no relationship with the new grass. Prof. Hackel, however, places *Jouvea* in the section *Hordeaceæ*, next to the genus *Monerma* R. & S., which genus by Bentham is united with *Lepturus* Br. It is at least closely related, and has hermaphrodite flowers, inserted in deep excavations on alternate sides of the rhachis or spike. In *Jouvea*, with which Mr. Hackel compares *Monerma*, the female plant is said to have the usual number of glumes in each spikelet, and the spikelets to be immersed half way in an excavation of the rhachis, the outer glume being cartilaginous and adnate for the half part to the rhachis. With the information at present at my command I do not see any relationship between this grass and the group in which it is placed by Prof. Hackel.

In *Jouvea*, as described by Fournier, the female plant has a rush-like habit, with short, acute, pungent leaves, and a

terminal spike or two spikes, with 2 or 3 spikelets, half way immersed in the spike, and with the outer glume adnate to it for half its length. One character of our grass is, so far as I know, unique, that is the slight attachment of the short spikes to the rhachis and their ready deciduousness. When mature they drop off at the slightest touch. If we may judge anything of the relationship of this grass from the male plants, it will clearly come near *Uniola* and *Distichlis* in *Festucaceæ*. The male specimens collected by Dr. Palmer are mostly old and mutilated, but there are some sufficiently preserved to show their structure. The same branching habit occurs as in the female plant, but the inflorescence is spicate-racemose, the spikelets frequently an inch or more long, and 10 to 15-flowered, mostly with but one empty lower glume; the flowers are distichously arranged, the flowering glumes lanceolate, acute, between 2 and 3 lines long, smooth, keeled, but with no lateral nerves. The palet is a little shorter, 2-keeled, and scabrous on the keels. The stamens are mostly fallen, but Mr. Holm found some flowers with two, and Mr. Coville found some with three.

In comparing this plant with *Distichlis* in the herbarium, I found a specimen of what is evidently the same plant, collected by L. J. Xantus in 1859-60 at Cape St. Lucas, Lower California, and ticketed by Dr. Gray as a variety of *Brizopyrum spicatum* (the old name for *Distichlis*), and in Dr. Gray's account of Xantus' collection in *Proc. Am. Acad.*, vol. 5, with reference to this specimen, number 121, he says, "female specimens with the spikelets an inch and a half long, quite unlike any *Uniola spicata* Linn. met with on the eastern coast of the United States."

Although Dr. Gray took the plant to be the female, an examination shows it to be the male, and the spikelets are, as he says, an inch and a half long. There is reason to think also that a grass collected at the same time and place was the female plant corresponding. It is no. 119 of the collection, respecting which Dr. Gray says, "a new grass of uncertain genus, the single specimen mislaid."

Distichlis, as is well known, is diœcious, but the female spikelets are like the male ones, except in containing ovaries and styles instead of stamens. The new species of *Uniola* (*U. Palmeri*), from the head of the Gulf of California, is also diœcious, thus practically uniting *Uniola* and *Distichlis*, but in that species the male and female spikelets are also similar.

With my present knowledge of this grass, and its suggested

relationships, I am obliged to consider it a new genus, which I will designate by the name of **Rhachidospermum Mexicanum**.

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Grasses in the wrong genus.

W. J. BEAL.

In a recent study of our species of *Aristida*, *Stipa*, and *Oryzopsis*, it seemed to me best to slightly modify or extend the characters of the two latter genera and restore Nuttall's genus *Eriocoma*. In accordance with this plan, four species formerly placed under *Stipa* should take positions under *Oryzopsis*. I expressed my views in regard to such a position for these species in a letter to Professor F. L. Scribner, and to them he fully agrees. I present the descriptions of *Stipa*, *Oryzopsis*, and the four species in question.

STIPA L. Spikelets 1-flowered, on slender spreading pedicels or nearly sessile in a terminal panicle, rachilla articulate above the empty glumes: the two empty glumes narrow, persistent, membranous, keeled, unawned or rarely with a slender awn: floral glume narrow, rigid, rolled around the flower, usually with a curved short-pointed hairy callus at the base, and a terminal undivided bent awn closely and spirally twisted below the bend, sometimes with a tooth on each side the base of the awn, the awn tardily separating by a joint or rarely persistent: palea enclosed by the floral glume, 2-nerved: lodicules often 3 and large: stamens 3; anthers often tipped with a tuft of short hairs: styles short, distinct: caryopsis narrow, subterete, enclosed by the floral glume, but free.—Tufted, usually tall grasses, the narrow leaves often convolute or involute. The ciliate hairs on the stipe, aided by the twisting and untwisting of the awn, often bury the grain in the soil.

ORYZOPSIS Michx. Spikelets 1-flowered, usually ovoid or oblong, paniculate, rachilla articulate above the lower glumes, not produced above the flower, with a very short blunt or truncate callus: empty glumes 2, persistent, equal or the outer a little shorter, broad, obtuse or abruptly pointed, convex on the back: floral glume broad, shorter or longer than the other glumes, membranous becoming hard, ob-